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Virtual, Augmented and Mixed Reality, trendy gimmicks or essential resources in future medical libraries?

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Virtual, Augmented and Mixed Reality

Trendy gimmicks or essential resources in future medical libraries?

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Image from Shutterstock

Content

- Trends and development of e-resources in medical libraries
- Basics, applications and benefits of VR, AR and MR in medicine and in medical education
- VR, AR and MR in medical libraries

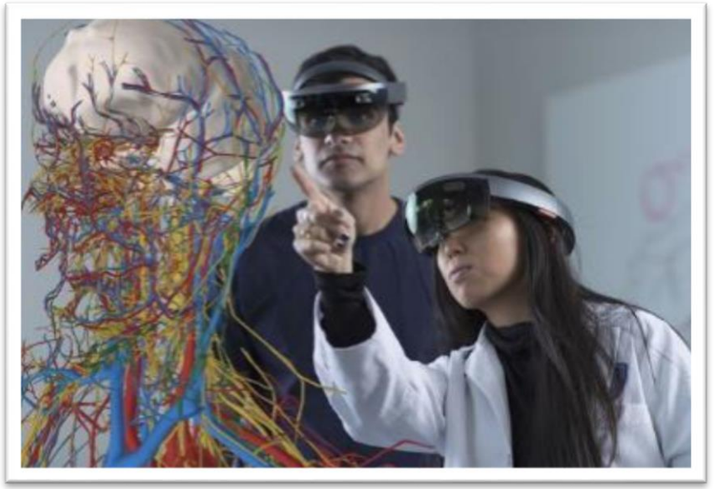


Image from Microsoft Hololense

Conflict of interest

All resources included in the presentation are for topic demonstration only. There is no financial interests between the presenter and any of the publishers or companies behind the products included in the presentation.

E-resources in medical libraries

- Many medical libraries worldwide go fully or partly digital
- Supports evidence-based-practice and clinical learning
- Responsibility to keep updated collections
- Increased no. of point-of-care tools like mobile apps
- Increased demand for blended learning support tools

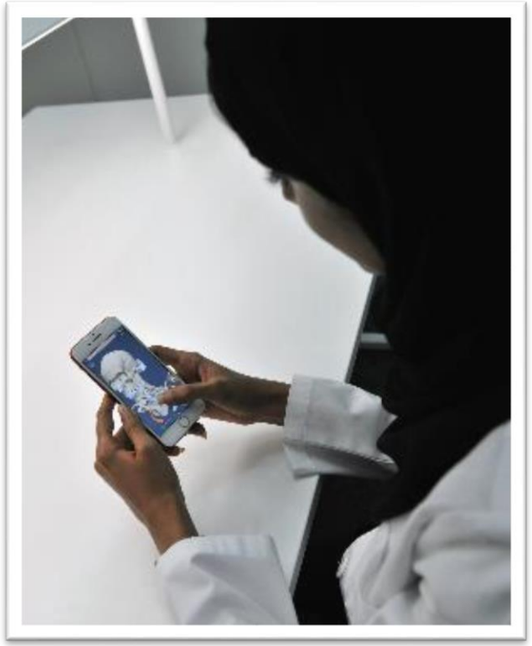


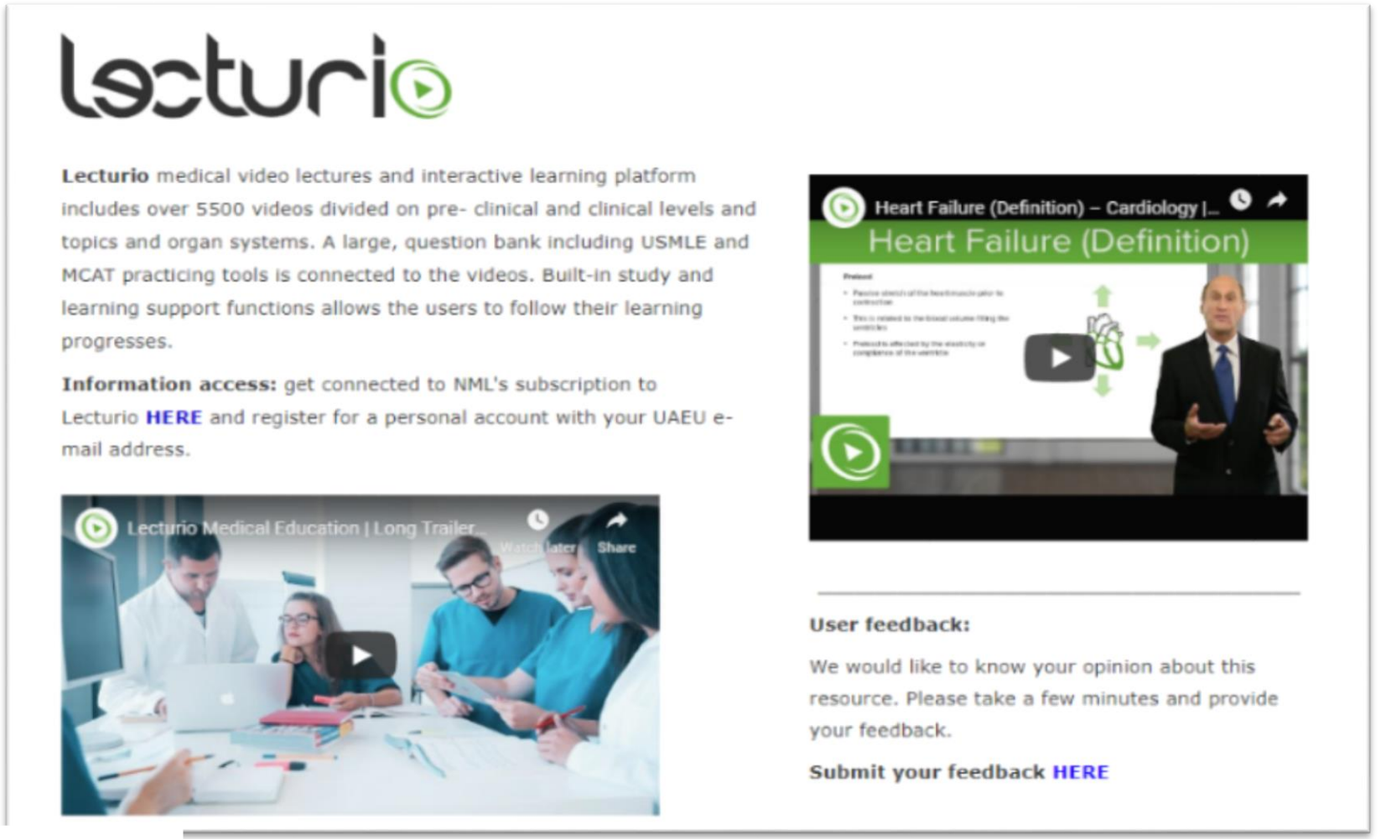
Photo by UAEU photographer

The National Medical Library at UAEU, Al Ain

- First medical library in UAE
- Strong focused on e-resources
- Provides cutting edge medical information resources and learning, teaching and research support tools
- Mobile apps, blended learning, research and point-of-care resources most popular

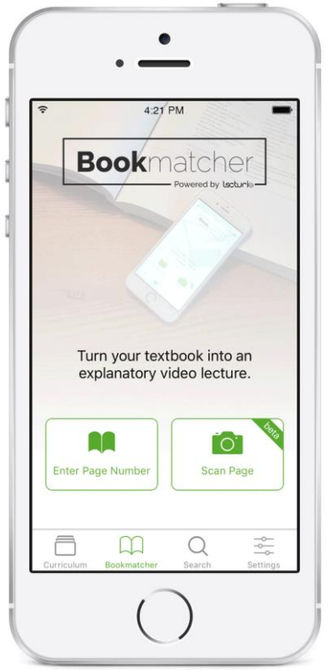
Photo by UAEU photographer

Medical video lectures and learning platform



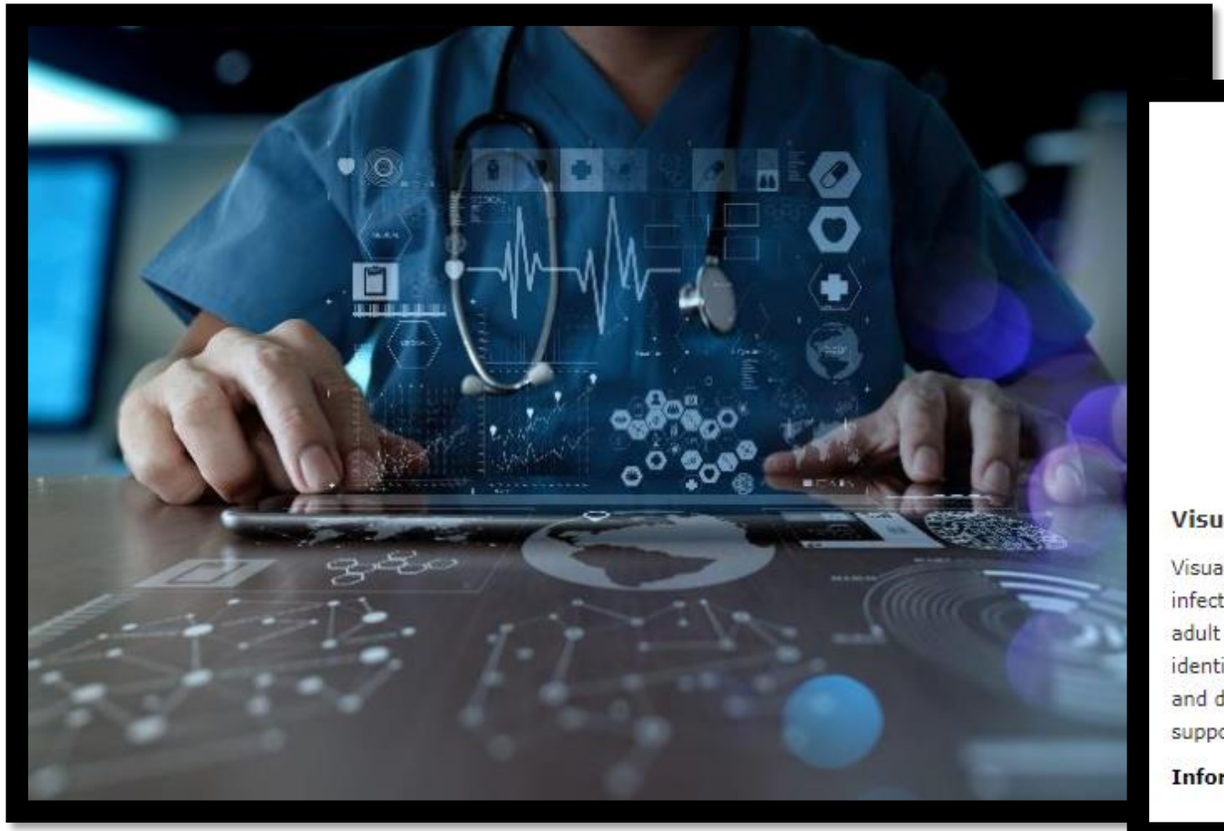
Images from Lecturio

Medical textbook app for blended learning support



Images from Lecturio

Point-of-care tools/apps for medical education



VisualDX

VisualDX is a clinical decision support tool designed to help with diagnosing of dermatological, infection, genetic, metabolic, nutritional and occupational diseases. Settings for pediatric or adult diagnosis available. The resource includes more than 140,000 images of visually identifiable diseases, drug reactions, and infections. Basic descriptions of different diagnosis and direct links to UpToDate and PubMed, provides the users with clinical background and support information. A mobile app is available for easy access to VisualDX at the point of care.

Information access: UAEU

Image from Shutterstock and VisualDX

PRIMAL PICTURES

Primal Pictures interactive 3D graphics of the human body includes features such as a 3D Atlas, a 3D Real Time rotating anatomy study tool, Functional Anatomy, Imaging, Therapy, introductions to Clinical Specialties with case studies and much more. A study guide, student quizzes, saving/sharing and notes functions are in addition available for best possible learning support.

Information access: get connected to NML's subscription to the Atlas **HERE** and create and account to save personal settings, images and study notes.

Download the apps: free from your app store

Images from Primal Pictures

Images from Primal Pictures

The future medical doctors:

- Will not practice medicine with a textbook in their hand
- Will work with headsets enabling detailed, 3-D analysis of their patients' anatomy or injuries connected to the latest medical information
- Will benefit from library access to the latest medical resources during their education

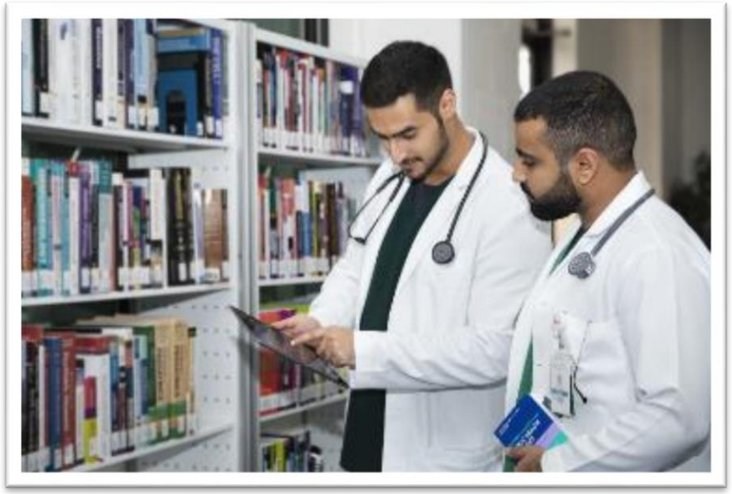


Photo by UAEU photographer

Virtual, augmented and mixed reality in medicine

- The latest trend and cutting edge development in higher education and medical practice
- The future of medicine and medical education
- VR in medicine started in the mid-90s but is still in the developing, implementation and evaluation phase
- Training and skills needed for VR and AR in clinical practice

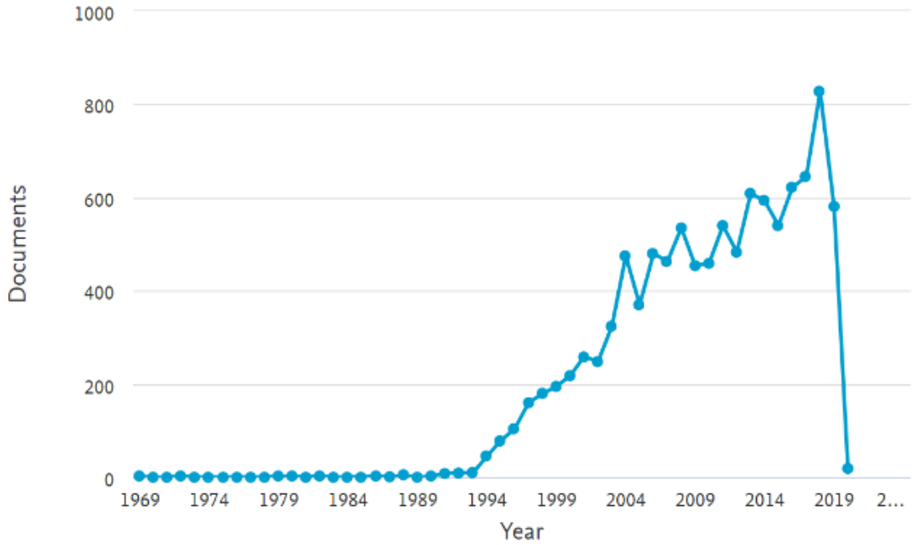
Image from Shutterstock

Research trend: VR, MA and AR in medicine

Scopus Search Sources Alerts Lists Help SciVal Register Login

Analyze search results

2020	19
2019	581
2018	828
2017	645
2016	622
2015	540
2014	593
2013	609
2012	483
2011	540



Source: Scopus

Virtual reality for medical science in the UAE

Akre et al. 2018:

- VR in medicine is a very new area
- Usage of Medical VR applications is so far minimal in UAE
- No wider implementation or use by health professionals or students
- No research about the benefit of VR for health providers or patients in UAE

The basics

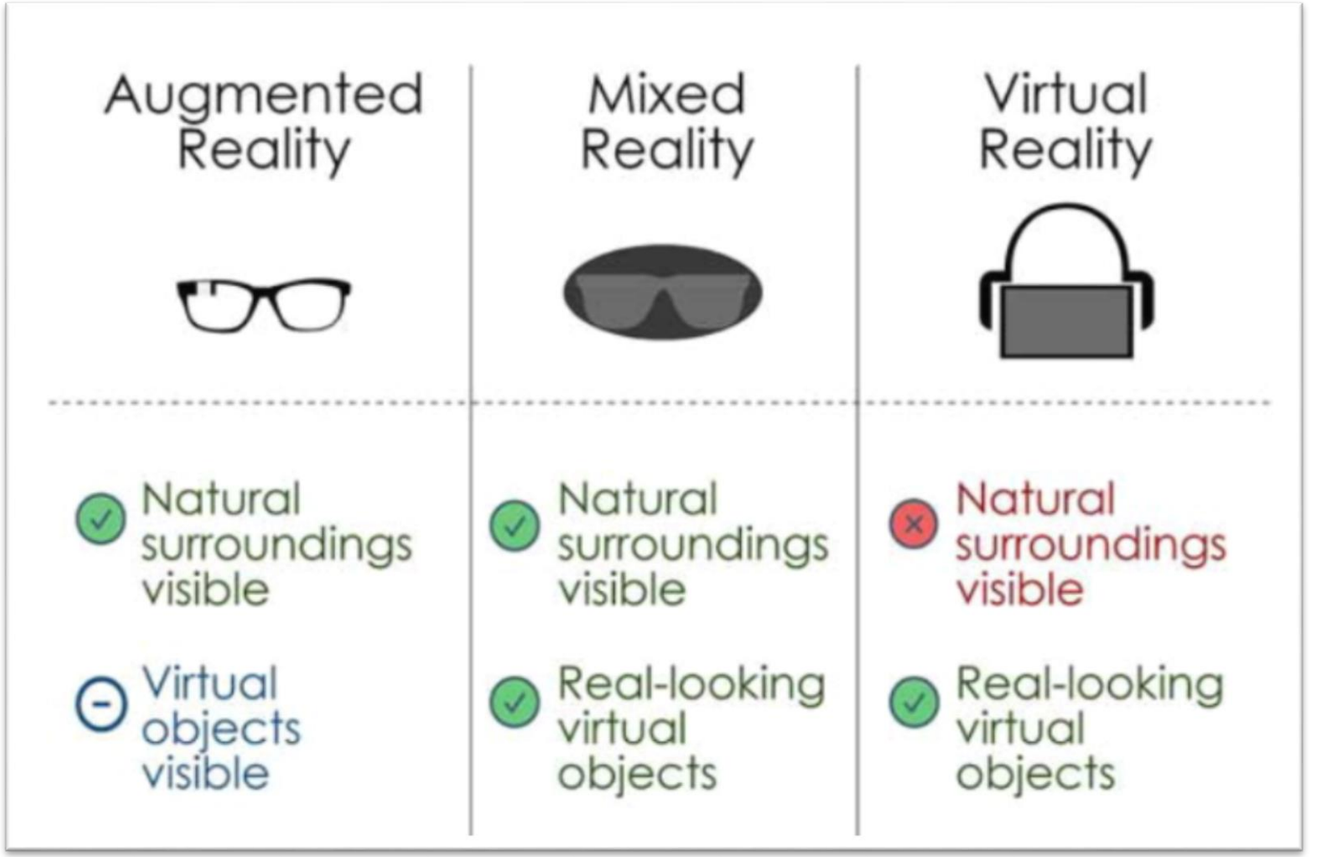
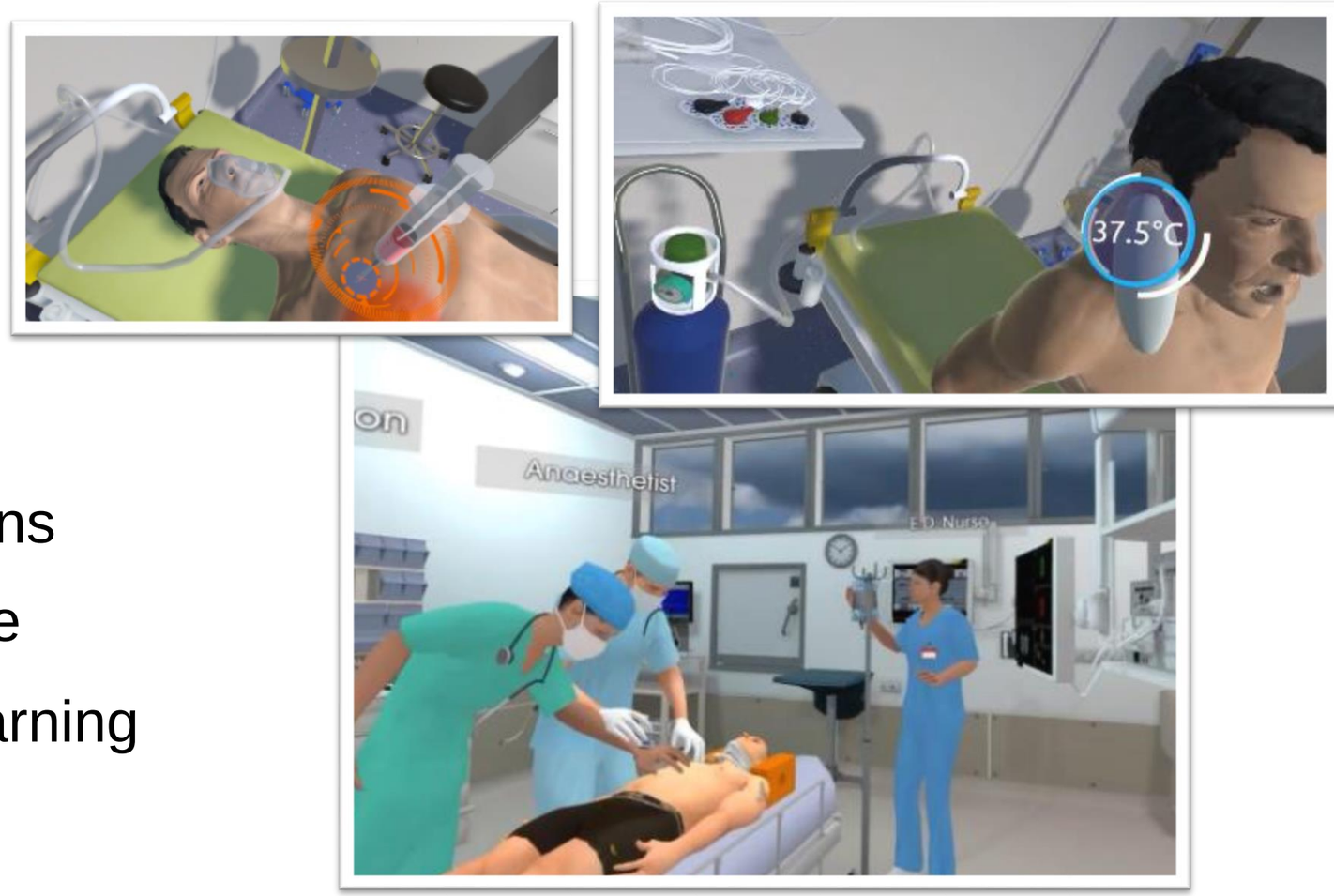


Illustration from Brigham, 2017

Virtual Reality (VR)

- Virtual environments with interactive clinical, patient and teamwork scenarios
- Treatment outcomes are based on VR clinical decisions and actions
- For training or educational practice
- Teacher led, team or individual learning



Images from Simforhealth

Augmented Reality

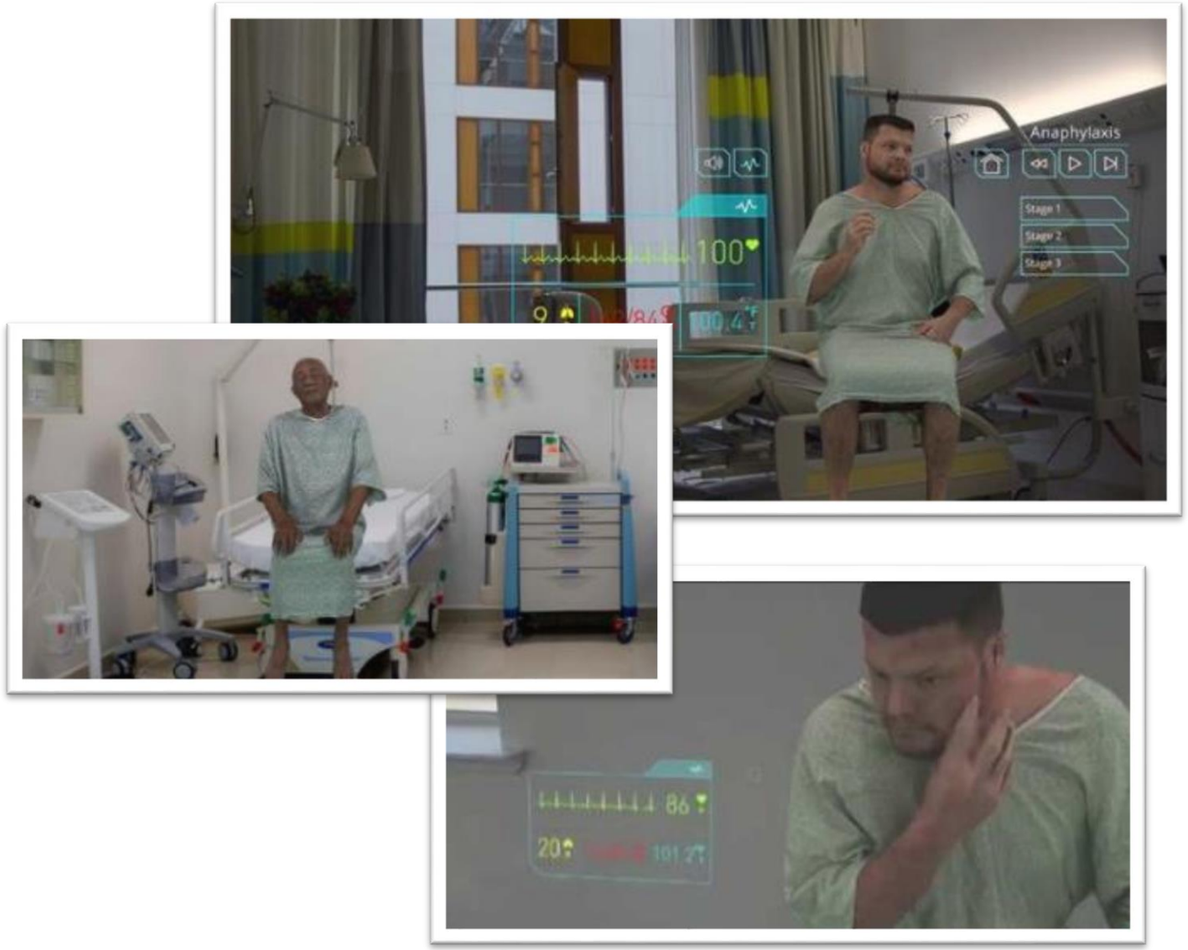
- Hologram through lenses/screens seen in natural surroundings
- Brings textbooks and worksheets “alive”
- Organ/bone exposure on patients
- For training, education and clinical practice (connected to library resources)

Images from Pearson and Visible Body

Images form Visibel Body.com and Cleveland clinic

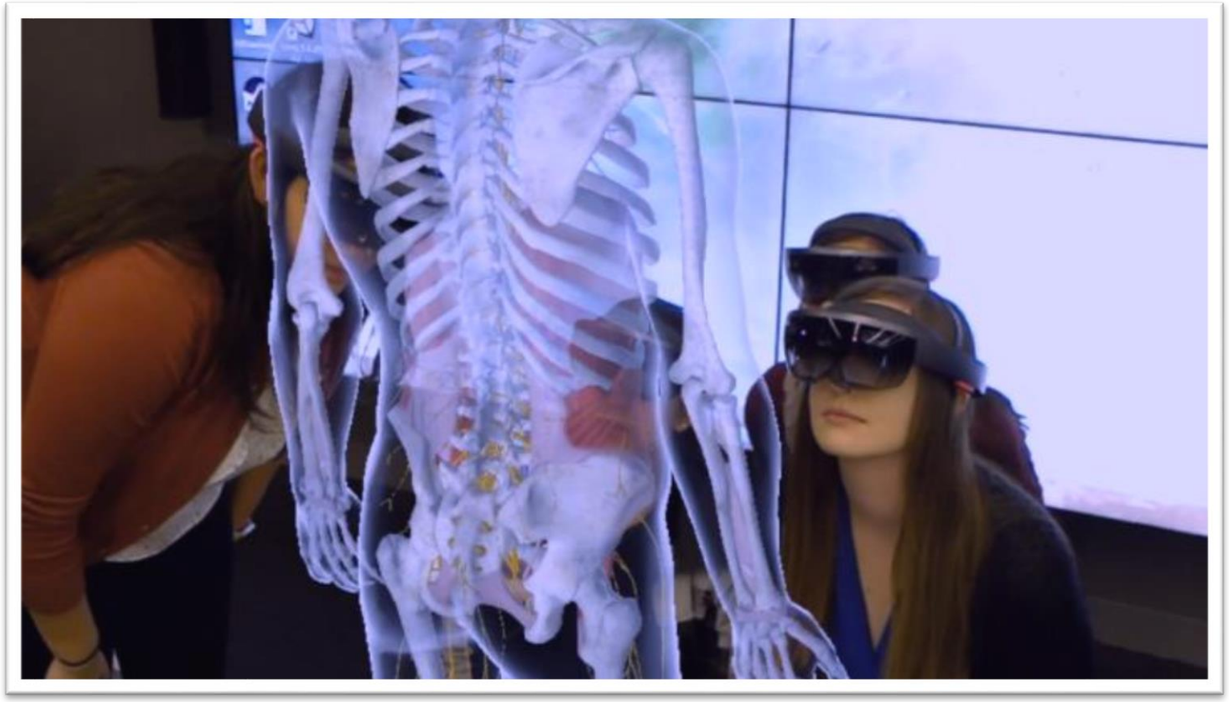
Mixed Reality (MR)

- Hologram exposure of patients/persons in natural surroundings
- Interactive treatment scenarios
- Outcomes based on the clinical decisions and actions
- For training or educational practice
- Teacher led, team or individual learning



Images from Microsoft HoloLense

A new chapter in medical education



https://www.youtube.com/watch?v=gzUTT1Kygo4

Video capture from Case Western Reserve University

VR, MR and AR in Medical Education

- Early reasearch indicates positive effect on student learnng
- Enhanced clinical and academic performace
- Teach patient interaction, empathy and teamwork
- Enhanced learning and teaching engagement
- Gives student confidence before meeting real patients

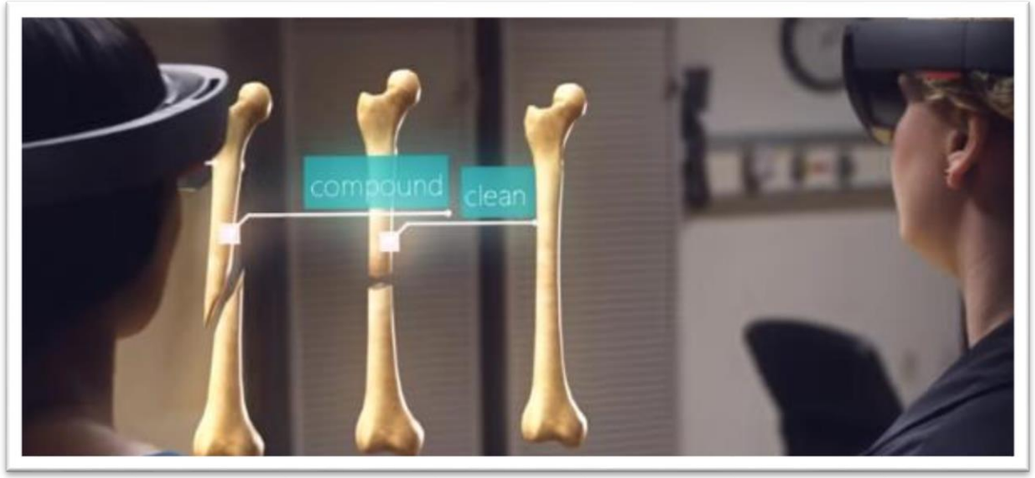
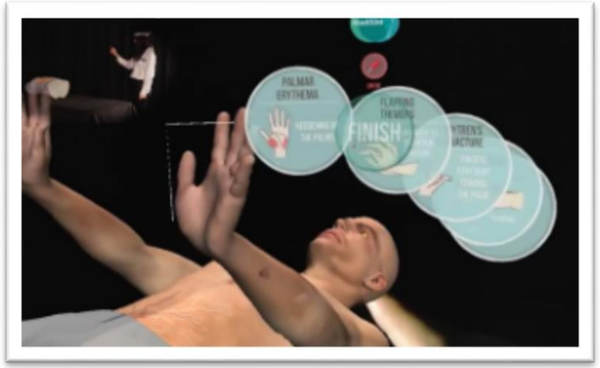
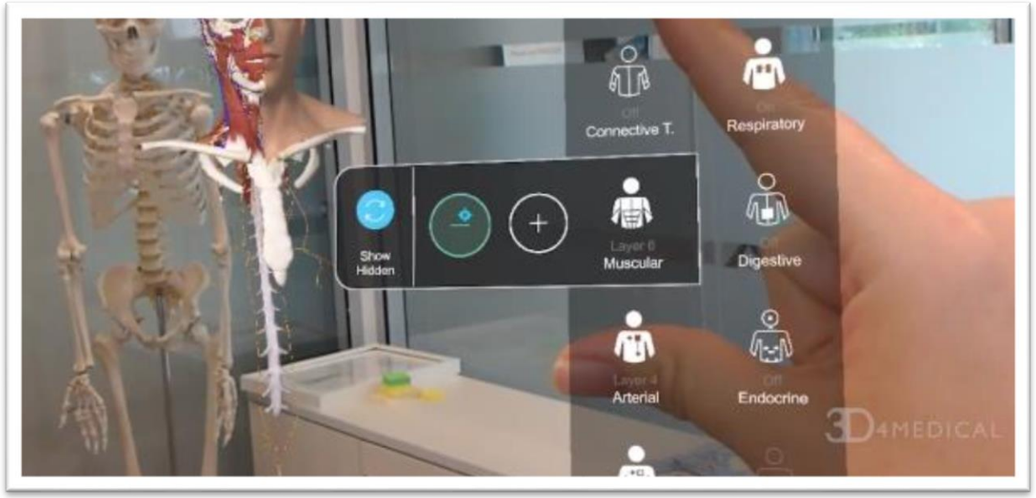


Image from Microsoft Hololense

Benefits of VR, MR and AR in medical education

- Safe practicing
- Realistic experience/feeling
- Current techniques deliver anatomical details with high accuracy
- Vitals and test results integrated
- Resources connected to background information supporting the learners





Images from MediSIM and Microsoft HoloLens

The next generation anatomy and dissection learning

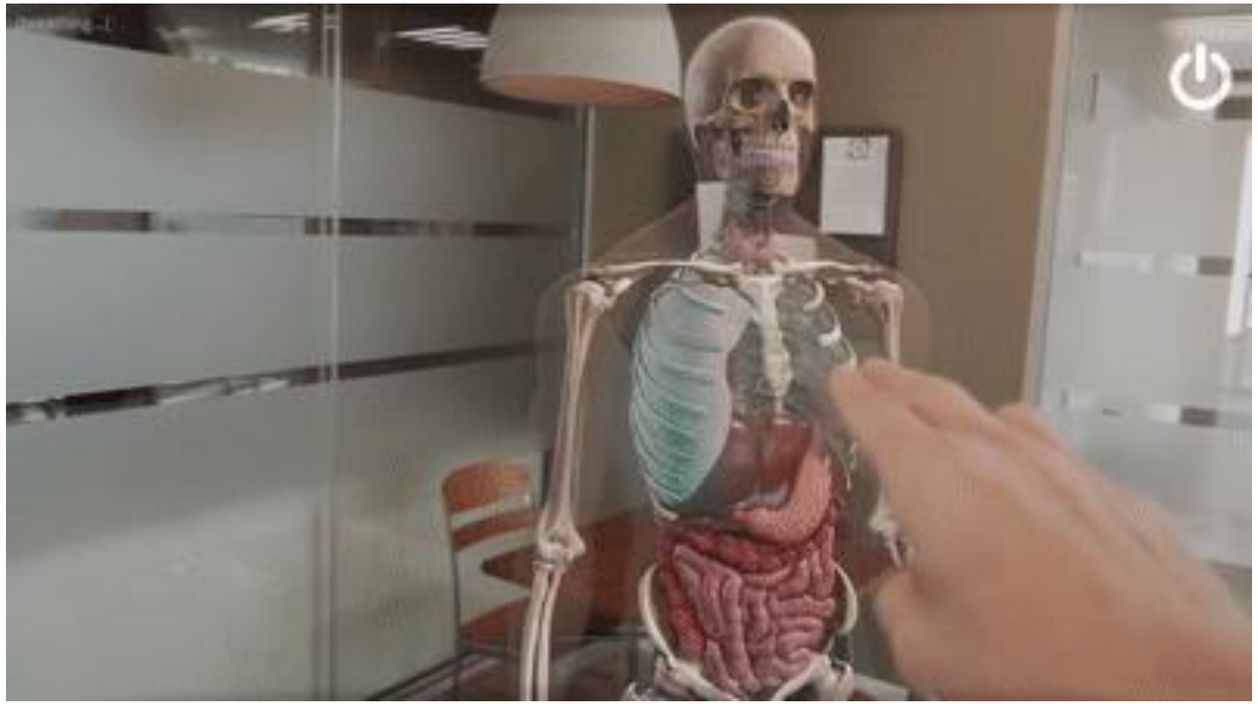


Image from Pearson Immersive

Emergency, trauma and highly stressful situations

- Case exposure and training outside critical life and death situation
- Stress and teamwork training
- High-risk pediatric trauma cases
- Obstetrics and gynecology experience

Image from BioflightVR

Clinical skills practicing

Images from Airway VR and Microsoft Hololens

VR, MR and AR in clinical settings

- Reduced complications and patient harm
- Enhanced surgery and treatment quality outcomes
- Safety improvement

Image from 2018 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)

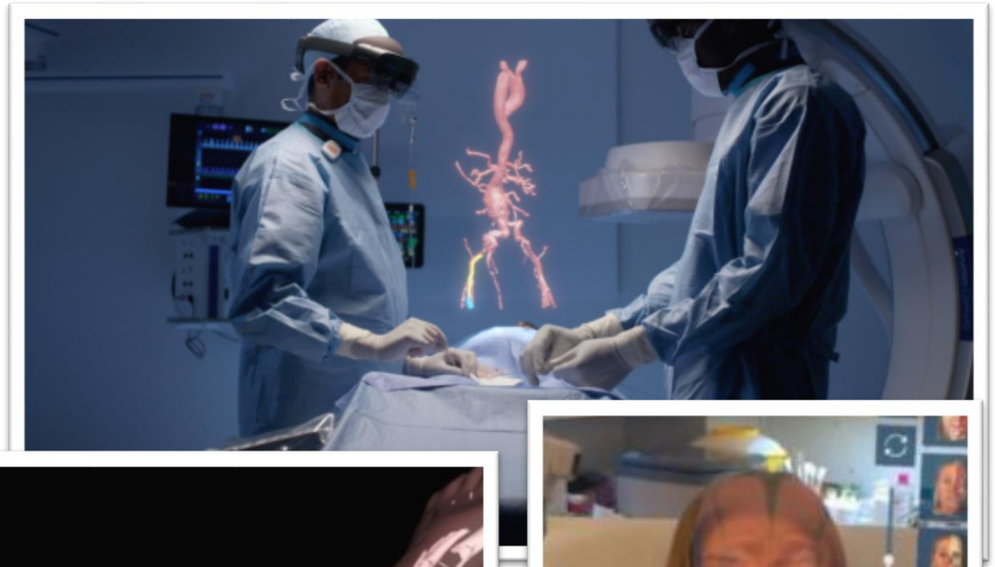
Pre-treatment, surgery planning and practicing

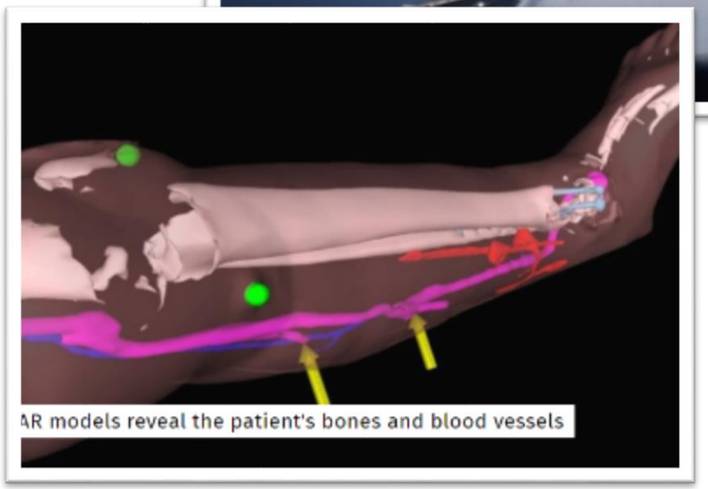
- Surgery skills and learning practice
- Analyze the extent of injuries/tumors/aneurysm
- Can reduce post surgery complications and increase patient's quality of life

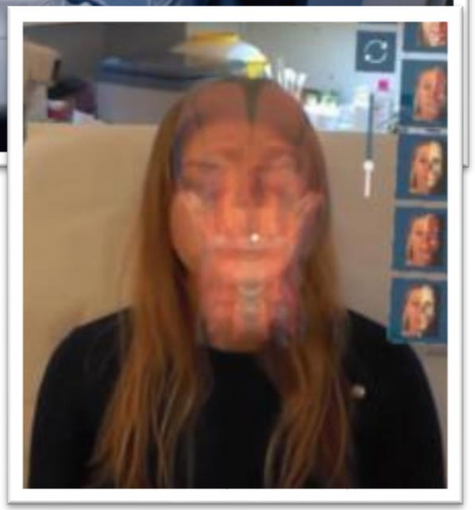
Image from Microsoft Hololens

During surgery/procedures

- Augmented reality exposure of the injury
- Organ/vein/bone holograms



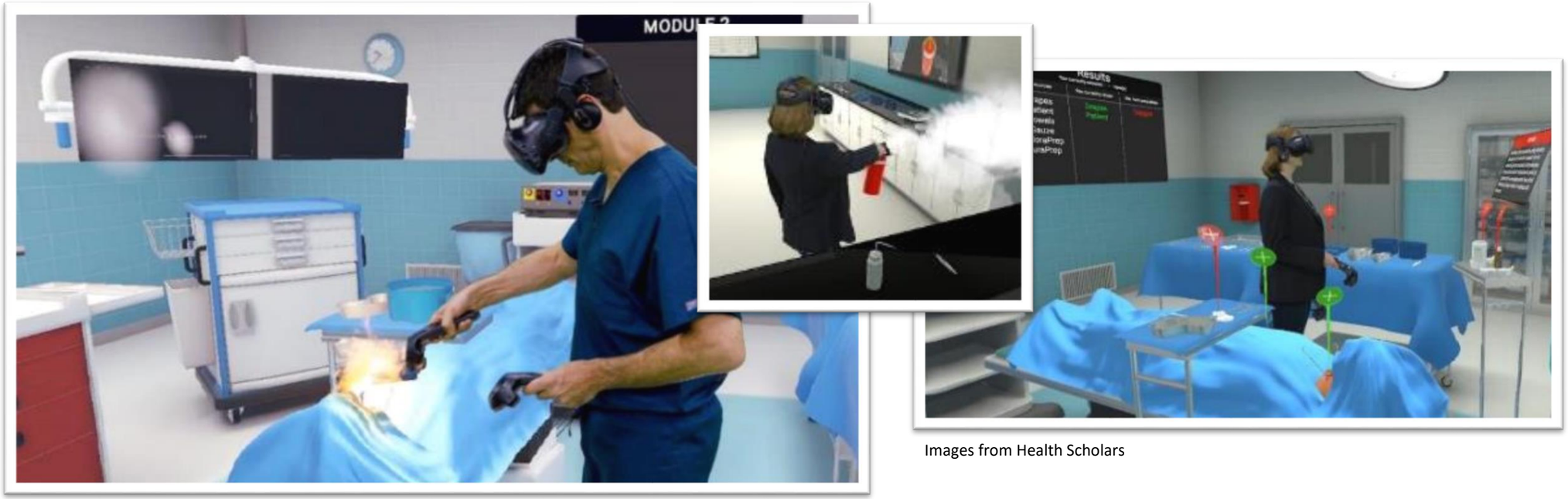




Images from Microsoft Hololens and from Pratt et al. 2018

Safety training to prevent medical errors

Example: surgical fires



Images from Health Scholars

Patient education/information

- Increased communication
- Increase patient understanding
- Post or pre information
- Involving relatives

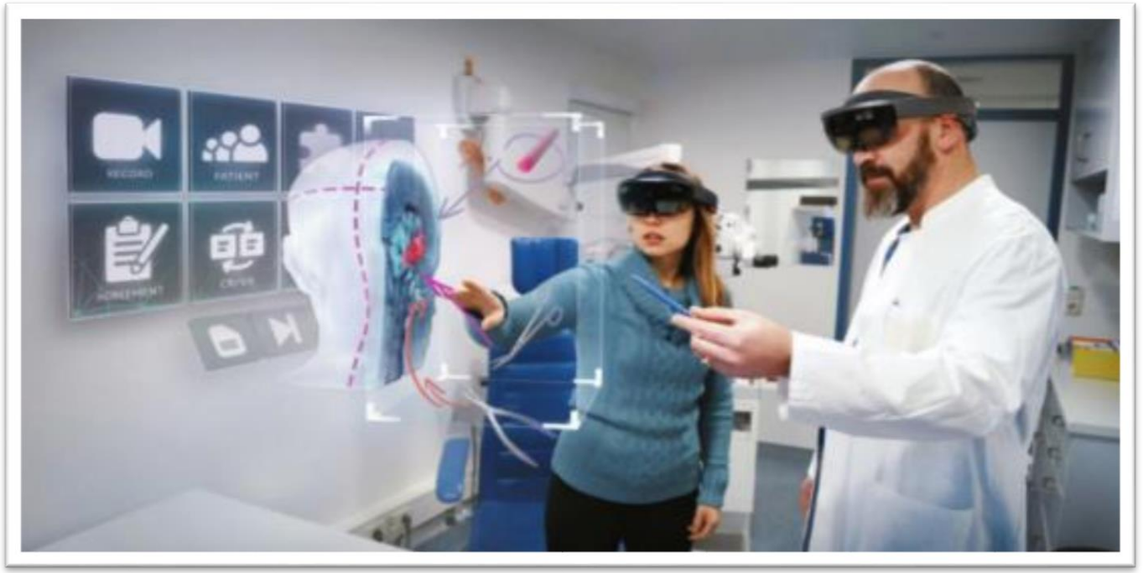
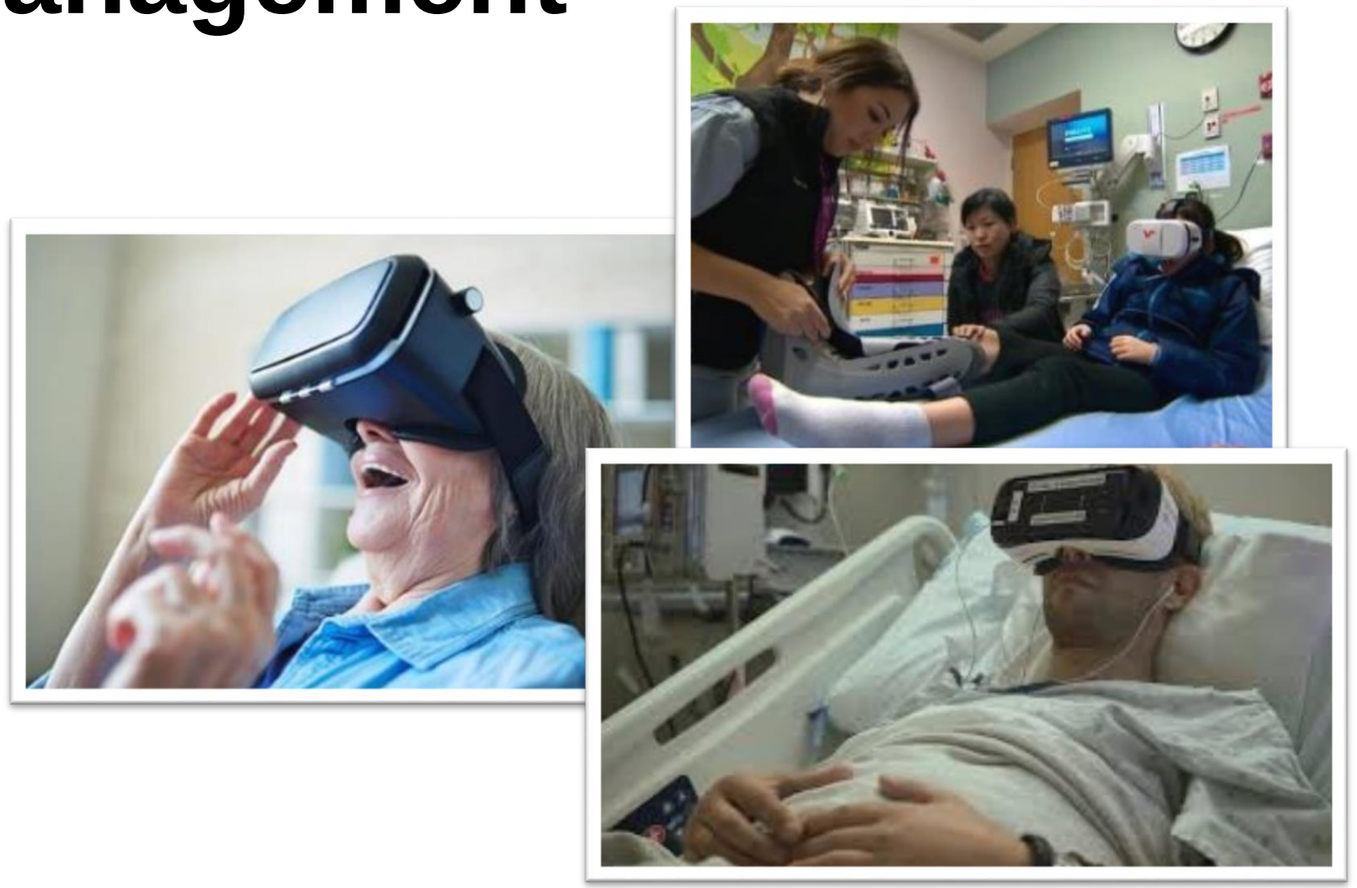


Image from Microsoft Hololens

Pain and anxiety management

- Treatment distraction
- Relaxation before surgery
- During local anesthesia
- Pain management
- Quality of life in elderly



Images by CBC News, Shutterstock and Cedar-Sinai Hospital

Psychiatry and psychotherapy

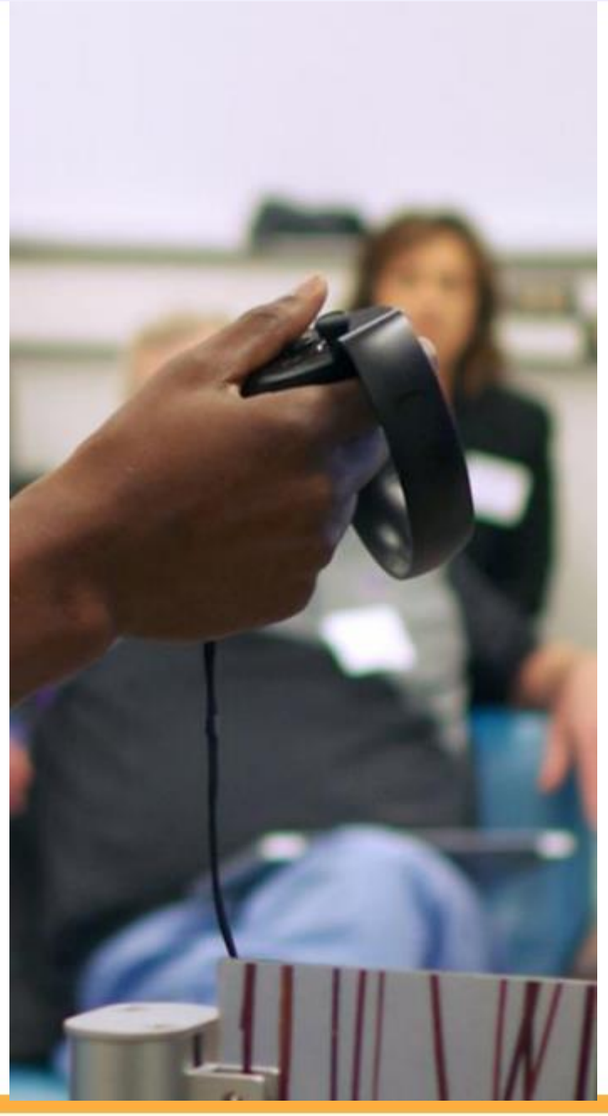
- Social and cognitive (ADHD, psychosis, paranoia and anxiety disorders)
- Depression therapy
- PTST
- Phobias
- Simulation of mental illness for training health care providers
- Schizophrenia (avatar therapy)

Image from Oxford Cognitive Approaches to Psychosis, University of Oxford

VR, MA and AR in medical libraries

- Are the next generation teaching and leaning support tools in medical libraries.
- An increasing number of medical education and training software and affordable devices available
- Medical libraries have experience and competences to set up trials, acquire, manage and support software and hardware needed
- Libraries can take the lead in introducing VR, AR and MR at their institutions

Image from Fraser Valley Regional Library



The technology

- Headsets (hand controls)
- Software matching the headsets
- A computer with large storage and graphics capacity
- Display screen/projection wall for interaction and promotion

Image from More et. al 2018

Developing a VR/MA/AR lab in the library

- Set up a physical space
- Furniture to accommodate both group work and case simulations
- Reference/information support for evidence- based practice
- Integrity importation

Image from More et. al 2018

VR, MA and AR in medical libraries

- Libraries are central and easily accessible for all
- Gives learners the possibility to explore and practice outside class hours
- Institutional wide implementation can take time and meet resistance
- Small scale introduction in the library

Image from Microsoft Hololens

VR, MA and AR in medical libraries

- Introducing VR, AR and MA in medical libraries creates increased user engagement and broaden the library's pedagogic mission
- Helps profiling libraries as modern, high technology learning hubs
- Helps with reshaping the image of medical libraries and library collections

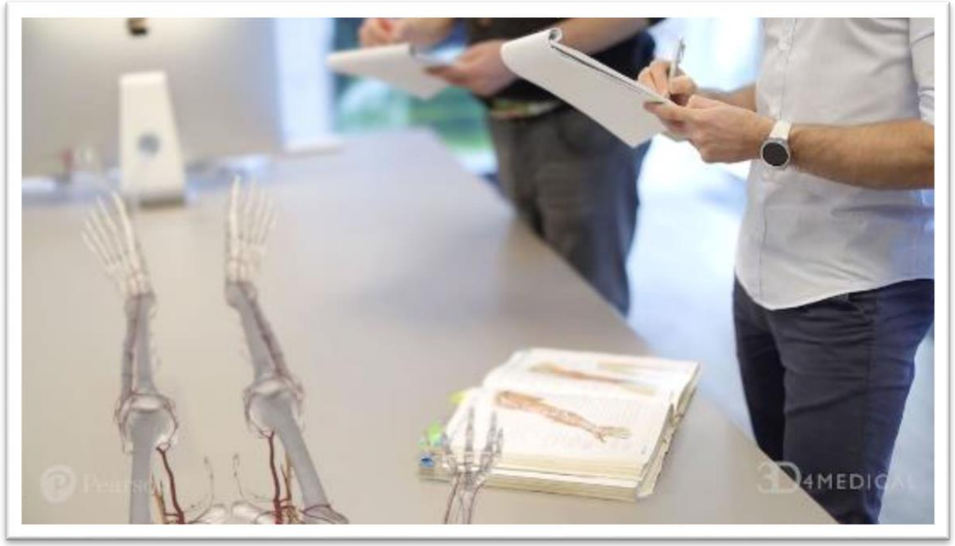


Image from Microsoft Hololens

The National Medical Library Majlis

Photo by UAEU photographer

Conclusion

- Medical VR, MA and AR applications are not only trendy gimmicks or games
- These technologies are the cutting-edge development in higher education and medical practice
- Medical librarians are well equipped to manage and acquire VR, MA and AR software and devices
- Introducing VR, MA and AR gives the medical libraries an opportunity to profile themselves as the new generation learning hub
- VR, MA and AR will change the concept of e-resource management and pedagogic support in medical libraries
- More research about resource management and benefits of introducing VR, MA and AR applications in medical libraries is needed

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